In the Flora of Vermont by Brainerd, Jones, and Eggleston, published in 1900, under Additions and Corrections, the authors, on page 106, referring to *Hydrophyllum canadense* as occurring in Vermont, cite the specimens collected in Charlotte by Mr. Pringle, and discussed at length by me in the paper above mentioned, on pages 156–158, and say that they "were somewhat abnormal but were so named by Dr. Gray." This statement is entirely contrary to the opinion expressed by Dr. Gray to Mr. Pringle that the plant was "a monstrosity or abnormal condition of *H. Virginicum*," but Pres. Brainerd in reply to my inquiry writes me that the note is a "blunder, resulting from mixing up the two names, *H. canadense* and *H. virginicum*." — Walter Deane, Cambridge, Massachusetts.

NOTES ON NEW ENGLAND HEPATICAE,— II.

Alexander W. Evans.

(*Continued from page 174.*)

10. Lepidozia setacea (G. H. Web.) Mitt. Jour. Linn. Soc. Bot. **5**: 103. 1861. *Jungermannia setacea* G. H. Web. Spic. Fl. Goettingensis, 155. 1778. *J. sertularioides* Linn. f. Suppl. 449. 1781. *J. pauciflora* Dicks. Fasc. Pl. Crypt. 2: 15. *pl. 5, f. 9.* 1790. *J. Schultzii* Spreng. Plant. Pug. 1: 64. 1813. *Blepharostoma setaceum* Dumort. Recueil d'Obs. sur les Jung. 18. 1835. *Lepidozia sphagnicola* Evans, Bull. Torrey Club, **20**: 397. *pl. 162.* 1893. The true *Lepidozia setacea* is much rarer in North America than the printed records would seem to indicate. In fact nearly all of the American material which has been referred to this species belongs to the following, and this is true even of the specimens distributed in Hep. Bor.-Amer. *76* and in Hep. Amer. *85*. A number of years ago the writer found an abundant supply of a *Lepidozia* growing in a bog and, recognizing its distinctness from what had passed for *L. setacea* among American writers, described it as new under the name *L. sphagnicola*. Recently, however, these plants have been restudied and carefully compared with European material, and it has become evident that *L. sphagnicola* is a synonym of *L. setacea* and that it is our much commoner plant growing in woods which is undescribed. Specimens

of both species have been submitted to Herr C. Müller, of Freiburg in Breisgau, Germany, who has kindly confirmed the above conclusion. The only New England stations for *L. setacea* which can be definitely cited at the present time are the following: Woods Holl, Massachusetts (*A. W. E.*); Bethany, Connecticut (*A. W. E.*).

11. **Lepidozia sylvatica**, sp. nov. *L. setacea* Auct. (in part). Growing in more or less compact tufts, often in company with other minute hepatics, brownish or yellowish green, varying to pale green: stems 0.08 mm. in diameter, ascending, irregularly pinnate or bipinnate; leafy branches usually lateral, very rarely postical, obliquely or widely spreading; flagelliform branches scanty, usually postical but sometimes terminating a lateral leafy branch; rhizoids sparsely developed, mostly restricted to the lower parts of the leafy axes and to the flagelliform branches: leaves transversely inserted, distant to loosely imbricated; stem-leaves averaging 0.21 × 0.18 mm., deeply trifid or quadrifid to within two or three cells of the base, segments entire, subulate, usually more or less incurved but sometimes straight and squarrose, two cells wide (rarely three or four cells wide) in basal portion and tipped with a row of from two to four cells; branch-leaves similar to the stem-leaves but smaller and usually bifid or trifid; leaf-cells averaging 16 × 14 μ, walls slightly and uniformly thickened, cuticle smooth or very indistinctly verruculose: under-leaves of the stem trifid (or very rarely quadrifid) to within one or two cells of the base, 0.15 mm. long, 0.065 mm. wide at base, segments when well developed similar to those of the leaves, one or two of the segments regularly aborted and reduced to one or two cells in length; under leaves of the branches smaller and often only twice divided: inflorescence dioicous: ♀ inflorescence borne on a very short postical branch, often with no leaves except those of the involucre; bracts and bracteoles in two or three rows, scarcely distinguishable from one another, those of the innermost row ovate, 1 mm. long and 0.35–0.5 mm. wide, usually bifid about one fourth with acuminate and denticulate or ciliolate divisions and a sharp and narrow sinus, rarely undivided, entire or sparingly toothed near base, cells longer and with thinner walls than in the leaves, cuticle more distinctly verruculose; bracts and bracteoles of second and third rows successively smaller and more regularly bifid; perianth narrowly ovoid or cylindrical, 2.7 mm. long, 0.6 mm. in diameter, terete below, bluntly trigonous above, the keels separated by narrow grooves, mouth more or less contracted, ciliate, the cilia one to four cells long and one or two cells wide at the base, cells of the perianth similar to those of the bracts: ♂ inflorescence borne on a short postical or, more rarely, lateral branch, usually proliferating at the apex into a leafy axis; bracts in four or five pairs, strongly concave, ovate, 0.35 mm. long, 0.2 mm. wide, bifid about one-half, the divisions acuminate, short-ciliate on the margins, sinus sharp, bracteoles mostly bifid

with subulate divisions; antheridia solitary, oval: capsule oval, yellowish brown, 0.9 mm. long, 0.5 mm. in diameter; spores minutely verruculose, yellowish brown, 12 μ in diameter; elaters reddish brown, with two spirals, 9 μ in diameter.

On shaded banks and rotten logs. New Hampshire. White Mountains (*Oakes*).[1] Massachusetts: Woods Holl (*A. W. E.*); Amesbury (*J. W. Huntington*); West Newbury (*Miss C. C. Haynes*). Connecticut: Westville (*R. Veitch, A. W. E.*); New Haven and Orange (*D. C. Eaton*); Hamden (*D. C. Eaton, A. W. E.*). The Westville specimens collected by the writer in April, 1903, may be designated the type. The following stations beyond the limits of New England may also be noted: Quaker Bridge, New Jersey (*A. W. E.*); Washington, D. C. (*J. M. Holzinger*); Tibbs Run, West Virginia (*A. LeRoy Andrews*); Dickey's Creek, Virginia (*Mrs. Britton & Miss Vail*); Enterprise, Florida (*L. M. Underwood*).

The leaf subtending a lateral branch in *L. sylvatica* is sometimes bifid and sometimes undivided; in other cases there is no subtending leaf whatever (*fig. 3*). The latter condition in fact is normally found on one side of a branching axis while subtending leaves occur on the other. The absence of such a leaf indicates that the whole, instead of a part, of an apical segment has entered into the formation of the branch. This substitution of a branch for an entire leaf is of especial interest and has not before been noted in the Hepaticae, although its occurrence was long ago suspected by Leitgeb.[2] The subtending leaves are sometimes found on the right hand side of an axis and sometimes on the left, according to the direction of the spiral. Similar variations also occur in *L. setacea*.

In their vegetative organs *L. setacea* and *L. sylvatica* resemble each other very closely, and it is sometimes difficult to determine sterile and poorly developed material. Usually, however, the leaves and especially the underleaves offer a few reliable points of difference. Under favorable conditions *L. setacea* is more robust, and its leaves are more regularly quadrifid; in many cases the antical segment bears an accessory tooth on its free margin, a condition which is exceedingly rare in *L. sylvatica*. Occasionally a bifid subtending leaf will show an accessory tooth of this character on each side. The

[1] These specimens have not been seen by the writer; further reference is made to them on page 189.

[2] Bot. Zeit. **29**: 562. 1871.

cuticle of *L. setacea* is distinctly verruculose while that of *L. sylvatica* is smooth or very indistinctly roughened. Unfortunately in slender forms of *L. setacea* these differences are not always apparent.

The underleaves of *L. sylvatica* are usually trifid but are occasionally quadrifid on very robust axes and are not infrequently bifid on slender branches. One or two of the divisions are tipped with the remains of hyaline papillae and are thereby aborted in their growth and reduced to one or two cells in length; the divisions without papillae become almost as long as the segments of the leaves. In *L. setacea* quadrifid underleaves are the rule on principal axes, although trifid and even bifid underleaves occur on the branches. Here again the remains of hyaline papillae may be detected on the tips of the divisions; apparently, however, they do not interfere to any great extent with the development of the segments, which never exhibit the extreme disparity in size found in *L. sylvatica*. Even on slender forms of *L. setacea* this difference in the underleaves seems to be constant.

The most important differential characters, however, are afforded by the perichaetial leaves. These have been repeatedly figured for *L. setacea*, but unfortunately the figures show little uniformity. The same statement will also apply to the published descriptions. In Hooker's British Jungermanniae (1816), the perichaetial leaves are figured twice: on plate 8, they appear deeply laciniate with very slender divisions; on plate 1 of the supplement, they are ovate in outline and undivided. Nees von Esenbeck [1] comments on plate 8 and states that he has never observed the bracts so finely laciniate; Gottsche [2] criticises the same figures and also remarks that those given on plate 1 are untrue to nature because they represent the bracts as being undivided; Austin [3] accepts the supplementary figures of the perichaetial leaves but rejects entirely those given on plate 8. As a matter of fact the bracts are almost intermediate in character between the two figures of Hooker; they are more or less deeply trifid or quadrifid with lanceolate, acuminate, dentate or ciliate divisions separated by very narrow sinuses. In some cases the primary divisions of the innermost bracts are not very deep, and oftentimes the laciniation seems to be even better marked on unfer-

[1] Naturgeschichte der europ. Lebermoose, **2**: 299. 1836.
[2] G. & R. Hep. europ. *655*. 1879.
[3] Hep. Bor.-Amer. *76*. 1873.

tilized flowers than on those with well developed perianths. Of later figures those published by Stephani[1] and Müller[2] bring out the characters pretty clearly. Pearson,[3] however, describes and figures the bracts as "bidentate" with the "segments ciliate-dentate, acuminate"; but, as these figures of the bracts are all drawn from North American specimens collected by Oakes in the White Mountains, it is hardly to be doubted that they represent *L. sylvatica* instead of the true *L. setacea*. It is also probable that Austin had no American material of *L. setacea* before him when he rejected Hooker's figures. Fertile material of *L. sylvatica* may be at once distinguished by the perichaetial leaves, some if not all of which will show the bifid character.

In the ciliate mouth of the perianth the two species agree with each other but differ from the recently described *L. trichoclados* C. Müll. Frib.,[4] in which the mouth is minutely denticulate. *L. trichoclados* is now known from several widely separated localities in Europe and is perhaps to be expected in North America. It is a fragile species and is hardly to be distinguished in sterile condition from slender forms of *L. setacea*. It is remarkable, however, for its short and delicate bracts, which are ovate in outline, slightly bidentate at the apex and irregularly denticulate in the upper part. *L. trichoclados* is also noteworthy because it matures its capsules in November; in the other two species these are matured in May or June.

12. SCAPANIA CONVEXULA C. Müll. Frib. Bull. de l'Herb. Boissier, II. 3: 42. 1903. Mt. Katahdin, Maine (*E. D. Merrill*), the type-locality.

13. SCAPANIA PALUDOSA C. Müll. Frib. *l. c.* 49. *pl. 1*. *S. undulata*, var. *paludosa* C. Müll. Frib. Beih. zum Bot. Centralbl. 10: 220. 1901. Tuckerman's Ravine and Mt. Pleasant, White Mountains, New Hampshire (*A. W. E.*); Mt. Mansfield, Vermont (*A. W. E.*); Magnolia, Massachusetts (*W. G. Farlow*).

The two species just noted are fully described by Herr Müller. *S. paludosa* is by far the commoner of the two and has a wide distribution in Europe, especially in subalpine regions; *S. convexula*, on the other hand, is known from the type-locality only. Both spe-

[1] Ber. d. botan. Ver. zu Landshut, **7**: *f. 83*. 1879.
[2] Hedwigia, **38**: *pl. 8, f. 14–16*. 1899.
[3] Hep. Brit. Isles, 124. *pl. 46, f. 13–17*. 1900.
[4] Hedwigia, **38**: 197. *pl. 8, f. 1–13*. 1899.

cies are allied to *S. undulata*; *S. convexula* is distinguished by its cordate antical lobe, the margin of which is coarsely spinose-dentate; *S. paludosa* is a delicate and flaccid species in which the antical lobe is broadly orbicular in outline, more or less cordate where it meets the postical lobe and distinctly decurrent on the other side. In *S. irrigua*, which is also closely related to *S. paludosa*, the lobes of the leaves are usually apiculate at the apex instead of being rounded.

In the writer's Preliminary List of New England Hepaticae, 123 species are noted. Of this number, 75 are accredited to Maine, 81 to New Hampshire, 67 to Vermont, 76 to Massachusetts, 65 to Rhode Island and 93 to Connecticut; while 31 species are accredited to all six of the New England States. During the short time which has elapsed since the publication of this list, additions have been made to the hepatic floras of every State except Rhode Island, and the majority of these are the result of explorations made during 1903. The most noteworthy of these additions have already been referred to in the preceding pages; the others are as follows:

For Maine. *Riccia Sullivantii;* Waterville (*E. B. Chamberlain*): this record was inadvertently omitted from the Preliminary List. *Harpanthus scutatus;* The Sands, near Prospect Harbor (*Mrs. A. R. Northrup*): specimens from this locality were kindly sent the writer by Miss Haynes.

For Vermont. *Frullania Brittoniae;* Jericho (*A. W. E.*). *F. riparia;* North Pownal (*A. LeRoy Andrews*). *Jungermannia lanceolata;* Willoughby (*Miss Lorenz*). *J. pumila;* Jericho (*A. W. E.*). *Lophozia Floerkii;* Mt. Mansfield (*A. W. E.*). *L. marchica*, *Mylia anomala*, *Scapania irrigua* and *Notothylas orbicularis;* Jericho (*A. W. E.*).

For Massachusetts. *Fossombronia Wondraczeki;* West Newbury (*Miss Haynes*). *Radula tenax;* Magnolia (*W. G. Farlow*). *Scapania curta;* Mt. Holyoke (*Miss Lorenz*).

The census of New England Hepaticae now stands as follows: total number recorded, 128; number recorded from Maine, 79; from New Hampshire, 85; from Vermont, 78; from Massachusetts, 83; from Rhode Island, 65; from Connecticut, 94; from all six States, 33.

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EXPLANATION OF PLATE 57.—*Lepidozia sylvatica* Evans. Fig. 1, part of plant with perianth, the latter seen from the postical aspect and enclosing a detached sporophyte, × 35; Fig. 2, part of sterile plant, postical view, × 50;

Fig. 3, part of stem with the bases of three branches, antical view, × 50; Fig. 4, ♂ inflorescence, lateral view, × 60; Fig. 5, stem-leaf, × 220; Figs. 6, 7, underleaves of stem, × 220; Figs. 8–10, perichaetial leaves of innermost row, × 35; Figs. 11–13, perichaetial leaves of second row, × 35; Fig. 14, transverse section of perianth in upper third, × 35; Fig. 15, teeth from mouth of perianth, × 220; Fig. 16, perigonial bract, × 60; Fig. 17, perigonial bracteole, × 60. The figures were all drawn from the type-specimen and were prepared for publication by Miss Edna L. Hyatt.

THE IDENTITY OF ANDERSSON'S SALIX PELLITA. — *Salix pellita*, Anders. Mon. Salix (1865) 139, was based on two plants, one from Lake Winnipeg (*Bourgeau*), the other from the Rocky Mountains (*Lyall*). Material of the Lyall plant in the Gray Herbarium is different from any eastern species, but is very near the recently described *S. subcaerulea*, Piper, which occurs from the mountains of Oregon and Northern California to Montana. In August, 1903, the writer examined at Kew original material of the Winnipeg plant of Bourgeau and found it quite unlike the Lyall specimen but exactly a species which abounds along certain rivers of Maine and eastern Canada; and since the Winnipeg shrub was first cited by Andersson, it, rather than the Rocky Mountain element of his complex species must bear the name, *S. pellita*. This species has long perplexed the botanists who are familiar with northern Maine; and for want of a more satisfactory disposition for the plant, it has been temporarily placed with *S. candida*. From that species, however, *S. pellita* is very quickly separated. *S. candida*, as yet unknown in Maine, is a species primarily of larch or arbor-vitae swamps, the branchlets, leaves (usually above as well as beneath) and capsules pubescent with *dull* whitish *lanate or flocculent tomentum*; and the young styles conspicuously tinged with crimson. *S. pellita*, a species ordinarily of gravelly or well-drained shores, has the young branchlets glabrous or at most minutely pilose, the leaves glabrous or quickly glabrate above, whitened beneath, at least when young, with *lustrous velvety or silky pubescence*; the ovaries and capsule *silky-tomentose*; the styles yellowish or brownish. In northern Maine and adjacent Canada *S. pellita* is one of the commonest willows, and the material now at hand shows it to range from the Dartmouth River, Gaspé County, Quebec, to the lower Androscoggin River, Maine, north to Lake St. John, Quebec, and west to Lake Winnipeg. — M. L. FERNALD, Gray Herbarium.